Appendix I

Post Construction Monitoring Plan

Proposed Scope of Work for Postconstruction Avian and Bat Studies at the Hounsfield Wind Energy Project on Galloo Island

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INTRODUCTION

The following draft scope of work is proposed for a postconstruction study of avian and bat impacts at the Hounsfield Wind Power Project on Galloo Island, Jefferson County, New York. The scope provided here is tentative and expected to undergo further changes through review with New York State Department of Environmental Conservation (NYDEC), The Army Corps of Engineers (ACOE) and United State Fish and Wildlife Service (USFWS). Changes may be made based on results of the specific studies and out of consideration of studies at other wind projects as the methodology for bird and bat postconstruction studies (especially fatality studies) continues to evolve.

The objective of the first year of the postconstruction collision fatality study is to provide a quantitative estimate of the number of bird and bat fatalities that occur at the Hounsfield wind plant in association with simultaneously gathered information on nocturnal movements of birds and bats. It is anticipated that upon analysis of the results of the first year's data collection effort, the NYDEC and the USFWS will review and comment on the effectiveness of the protocol used.

The fatality survey methodology is based on methods that have evolved from previous fatality studies at communication towers and wind energy facilities in various locations in the United States (Erickson et al. 2001, Erickson et al. 2002; Howe et al. 2002; Johnson et al. 2002; Erickson et al. 2003; Kerns and Kerlinger 2004; Arnett et al. 2005; Jain et al. 2007 & 2008). In particular, because of its pertinence to understanding wildlife impacts in New York, this study would closely follow the Jain et al. 2007 & 2008 fatality study currently being applied at the Maple Ridge wind project in northern New York. The fatality study would be conducted at a subset of turbines randomized by habitat and would be carried out for a period of 3 years. After the first two years of project operation and mortality surveys, NYDEC would review the results and make a recommendation as to when the third year of study should take place. The third, fourth, or fifth year of project operation might be selected as the final survey year. Acoustic studies are proposed for the first year of the study to measure nocturnal bird and bat activity as well as species composition.

This postconstruction wildlife study proposal also includes breeding bird surveys and diurnal movement surveys that duplicate similar preconstruction studies (Old Bird Inc. 2008a). The diurnal movement surveys are for documenting raptor and waterfowl activity, as well as diurnal movements of birds (particularly those nesting on Little Galloo) across Galloo Island. These studies would seek to document any avoidance behavior and habituation to the wind project. The breeding bird surveys are for evaluating changes in the composition of breeding birds after the project is built. In addition, a detail analysis of habitat change due to project construction would be provided.

Wind Project Description

The Hounsfield Wind Power Project will consist of up to 84 wind turbine generators (WTG) and one permanent meteorology tower on Galloo Island. Each 3.0 MW WTG will consist of an 80-meter-tall tubular steel tower; a maximum 90-meter diameter rotor; and a nacelle that houses the generator, transformer, and power train. The rotor will consist of three 45-meter-long composite blades. 23 of the 84 nacelles will be equipped with two aviation warning lights consisting of

flashing strobes (flashing white during the day, flashing red at night). With a rotor blade oriented straight up, each turbine has a maximum height of approximately 125 meters. All components of the turbine will be painted white. The met tower will be an approximately 80m high, freestanding lattice tower.

Project coordinator/manager

W. Evans would serve as manager of the project and bear responsibility for all aspects of the management of the project (supervising and training field teams, data management, report writing, reporting to agencies, etc.).

W. Evans has 20 years of experience with avian migration patterns in New York State and has played an active role in the effort to curb bird mortality at tall man-made structures. He co-chaired the first national conference on bird kills at communications towers at Cornell University in 1999 and is currently a member of the research subcommittee of the USFWS-organized Communications Tower Working Group. In addition, W. Evans directed the New York State communications tower mortality survey from 1999-2001. This survey involved fatality surveys at 15 broadcast towers in central New York during the fall migration period. He is currently the principal investigator of a NYSERDA-funded study evaluating an acoustic-based methodology for detecting flying animal collisions at the Maple Ridge wind project. That study involves a 30-day mortality survey under eight wind turbines.

FATALITY STUDY

Field methods and search frequency

With the goal of producing comparative data with other regional mortality studies, the Hounsfield project search protocol would be modeled proportionally after the mortality study being used at the Maple Ridge/ Flat Rock project. A total of 34 turbines (40% of all turbines) and one meteorological tower would be included in the study from April through November 15 (34 weeks) each year. A randomization process, stratified by habitat, would determine the specific wind turbines included in the study. All habitat types in the project area would be searched in proportion to the number of turbines located within each habitat type. In the first year, 40% of all turbines (34) would be surveyed for fatalities. 8 turbines (~10%) would be searched daily (1904 searches/yr) and 26 turbines (31% of all turbines) would be searched weekly (884 searches/yr). A single met tower would be searched weekly (34 searches/yr). Searches would not be conducted during lightning, snow, or heavy rain. In addition, a search of all 84 turbines for raptor and owl carcasses would occur approximately bi-weekly during the winter months (Nov 15-March) focusing on winter raptor and waterfowl fatalities. After the first year of study is completed, the data would be evaluated in consultation with NYDEC to determine what level of searching would be necessary in the second year of the study.

Prior to the commencement of the fatality survey, the search areas beneath all turbines in the study design would be cleared of brushy vegetation and mowed. Periodic mowing would occur to maintain short “grass” in the turbine search areas. The tentative mowing schedule below

would be adjusted accordingly to maintain vegetation at 6 inches or less above ground. For example in dry months mowing might be carried out less frequently.

Proposed mowing schedule:

April	2
May	4
June	4
July	4
August	4
September	4
October	2
November	1
Total =	25 mows per study turbine per year

Prior to the commencement of scheduled searches each year, each turbine site would be searched to locate residual carcasses that may have accumulated since the project began operating.

Search areas would consist of a 125 m x 125 m areas centered at each turbine. This would permit searching out to at least 60 m from the turbine base. 5-meter transects would be walked by a team of two searchers. Transects would be permanently marked to aid search routines and facilitate documenting locations of carcasses. Searches would commence within the first hour after sunrise. The time required to search individual turbines by two searchers would be <45 minutes, not accounting for additional time to document kills.

Ground cover information would be recorded for each of the turbine sites at the beginning of each year and during each turbine search. Additional daily records would include date, time period checking each turbine, temperature, barometric pressure, cloud cover, precipitation, wind speed and direction, observers, and temporal position in the scheme of recent weather and bird migration events.

For each carcass found, the following information would be recorded: species, date/time, observer name, identification number, turbine number, GPS coordinates, distance from turbine (m), perpendicular distance to the transect line (m), cardinal direction from turbine, habitat conditions as noted above, condition of the carcass (scavenged, whole, partial, duration of time on ground, etc.), and whether it was scavenged. Before processing begins, photographs of every carcass would be taken with a ruler or other means of noting scale in the image. Each carcass would then be collected and individually placed in a plastic, zip-lock bag, labeled with the date, identification number and observer's name.

Carcasses would be stored in a freezer at the project site and periodically transferred to the Cornell University vertebrate museum for more permanent storage. Surveyors would be added to the Cornell vertebrate museum's salvage permit. Some carcasses may be used for scavenging or searcher efficiency tests. Carcasses or remains not easily identifiable to species would be identified at Cornell University.

The study detailed above would be carried out for a period of 3 years following the completion of construction of the wind project.

Searcher efficiency

Bats and four size classes of birds would be dropped at randomly determined locations within the fourteen 125-m x 125-m search areas involved in the study. Each class of carcass would be examined independently, as well as collectively when calculating searcher efficiency. In addition, the two smallest size classes of birds would be evaluated with wet and dry specimens. In the former case, specimens would be laid out before significant rain events. All turbines included in the mortality study will have rain gauges within the 125-m x 125-m search areas.

Searcher efficiency information would be presented in a form for direct comparison with the Maple Ridge wind project's mortality study. The additional analyses with the smallest bird specimens (e.g., kinglet, hummingbird, Parula Warbler, etc.) and the rain-soaked specimens would be presented separately.

To maximize public confidence in the fatality search regimen, a separate searcher efficiency evaluation would be carried out by an agency independent of Old Bird, Inc. Dr. Kevin McGowan (former curator of vertebrates) at Cornell University has been contacted and has expressed interest in carrying out this independent evaluation. The protocol of the searcher efficiency test carried out by this independent agent would be similar to the searcher efficiency evaluation carried out by Old Bird, Inc.

Carcass removal study

Carcass removal studies would be performed at all 34 turbines in the study design over the course of the annual study period. An assortment of large, medium-sized, and small carcasses would be placed at documented locations in the turbine search areas. All carcasses would be either fresh or thawed fresh specimens. Carcasses would be checked 1, 2, 3, 4 days after they were placed, again on day 7, and then weekly for 6 weeks or until the carcass was removed or decomposed. Presence/absence for each carcass would be recorded as well a photograph of its body condition at each carcass removal check.

The length of time that a carcass remained in the study area would therefore be documented. Mean carcass removal time would then be calculated per turbine and for the 34 turbines as a whole. Bats and four size classes of birds would be examined independently and collectively when calculating the carcass removal rate.

Both the searcher efficiency and carcass removal tests would be carried out monthly, to cover the range of temperature/weather conditions and predator presence/activity that occur in each season.

Estimation of avian and bat fatalities

We would present our results in a spreadsheet format with the number of fatalities per wind turbine studied, including that figure corrected for scavenging and surveyor efficiency. We will then present a mean fatality rate plus or minus standard error for all 34 turbines. Categories will be broken out for birds and bats, specific species, general types of birds (songbird, waterfowl, raptor, etc.), four size classes of birds, and the efficacy of the different search intervals (daily or weekly).

To facilitate comparison, similar statistical analysis of collision fatalities would be used as in the Maple Ridge wind project fatality study. We will present additional statistical analyses that include the very small bird category and the rain soaked birds, the latter considering the rain patterns documented at the project site.

CARCASS ANALYSIS

Species identification

W. Evans will identify all avian species. Additional species identification assistance may be sought from staff at the Cornell vertebrate museum. Bat species ID, especially of *Myotis* species, would be coordinated with Al Hicks at NYSDEC.

Stable isotope and genetic testing for bats

A proportion of bats (to be determined by NYDEC) will have hair samples removed and sent off for stable hydrogen isotope analysis. The results of this analysis will help determine the geographic region of origin of the bats that are being killed (e.g., local populations or distant populations). Tissue samples will also be collected for DNA analysis and species confirmation on a portion of the bat carcasses found.

Initially, both studies will be carried out on 10 carcasses of Eastern Red, Hoary and Silver-haired. After review with NYDEC, additional genetic testing may be necessary depending on the outcome of these initial results. Consultation with NYSDEC would be made prior to the start of carcass searches for details of the sample-collection methods.

NOCTURNAL FLIGHT ACTIVITY MONITORING

Bat acoustic monitoring

Bat acoustical detectors will be deployed in a similar manner as for the preconstruction surveys (North East Ecological Services 2009). This information may help determine when flights of bats are occurring and if use of the wind project area by bats corresponds to bat mortality.

Four bat detectors would be deployed for operation on the project site in the first year of postconstruction study from April 1 – October 1. The devices would be mounted on a met tower

within the project -- two at the top (one aimed vertically; the other horizontally), one at the midpoint of the tower, and one near the base.

Bird acoustic monitoring

Avian acoustical detectors would be deployed in a similar manner as for the preconstruction surveys. This information may help determine when flights of birds are occurring and to what extent use of the wind project area by night migrant birds corresponds to avian mortality.

Two avian night-flight call detectors would be deployed for operation on the project in the first year of study from April 1 – November 15. The acoustic stations would be located at least 5 km apart to provide better coverage of the whole project area.

BREEDING BIRD STUDY

A breeding bird study would be carried out during the first, second, and in either the third, fourth, or fifth years after project construction. This study would follow the methods and scope carried out in the preconstruction breeding bird survey and would include point count surveys at all 84 turbine sites (Old Bird Inc. 2008c). In addition, a detailed analysis of habitat changes due to project construction would be provided.

EXPANDED POSTCONSTRUCTION STUDIES

Winter bird study

From mid-November through March, bi-weekly raptor and waterfowl surveys would be conducted. The methods would follow those carried out in the preconstruction Winter Bird Surveys (Old Bird 2008b). The purpose of this study would be to monitor raptor and waterfowl activity for correlation with fatality rates for these bird groups during the winter months. This study would occur in all three years of postconstruction study.

Diurnal movement study

From April through July, weekly surveys of bird movements over Galloo would be conducted. The methods would follow those carried out in the preconstruction Diurnal Bird Movement Surveys (Old Bird 2008d). The purpose of this study would be to monitor bird flight patterns over Galloo during the active nesting period of the colonial waterbirds on Little Galloo Island. This would allow correlation of such flight activity with fatalities at the wind project during the study period. It would also allow assessment of the degree to which avoidance flights occur based on comparison with the preconstruction study data. This study would occur in the first and third years of postconstruction study.

SCHEDULE

Listed species or large mortality events

State or Federally listed species would be reported to NYSDEC and USFWS within 48 hours of finding and identifying such carcasses. The protocol for collecting and holding any carcasses of listed species would be determined by the respective agencies. Similarly, these agencies would determine a threshold number of kills in larger mortality events in which they should be promptly notified.

Reports

A spring summary report would be produced following the completion of spring migration (April – June 10). This report would be filed June 15th and would provide the number and dates of actual turbine searches, number of carcasses (bats and birds) found, and a list of those carcasses (including the turbine number for each carcass found). A more detailed written report, including scavenging and searcher efficiency information would be provided by July 15. For the fall migration period (July - November) similar reports would be filed. The summary would be provided by December 15 and the detailed fall report would be provided by Jan 15.

Second and third year studies

After the first year of the mortality survey, the results would be evaluated by NYDEC to determine whether the study protocols established for the first year should be modified.

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